LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Claims 1-14 (canceled)

15. (previously presented) The method according to claim 29, further comprising:

a) hybridizing a third primer to a first portion of a second target sequence, wherein said third primer further comprises a second adapter sequence;

b) hybridizing a fourth primer to a second portion of said second target sequence wherein said first portion of said second target sequence and said second portion of said second target sequence are not adjacent;

c) extending either said third primer or said fourth primer towards the other;

d) ligating said third and fourth primers together to form a second modified primer;

e) contacting said second modified primer or its complement with said array, wherein said population of microspheres comprises at least a second subpopulation comprising a second capture probe, such that said second capture probe and said second modified primer or its amplification product from a hybridization complex comprising said second capture probe, said second adapter sequence; and

f) detecting the presence of said second modified primer.

16. (previously presented) The method according to claim 29, wherein said modified primer is amplified.

17. (previously presented) The method according to claim 29, wherein said detecting is done by hybridizing a labeled probe to said ligated first and second primers.

18. (previously presented) The method according to claim 29, wherein said substrate is a fiber optic bundle.

19. (previously presented) The method according to claim 29, wherein said discrete sites comprise wells.

20. (previously presented) The method according to claim 29, wherein said detecting is done by labeling amplification products from said ligated first and second primers.

21. (previously presented) The method according to claim 29, wherein either said first primer or said second primer is an allele specific primer.

22. (currently amended) A method for simultaneously detecting at least sixteen target nucleic acid sequences comprising:

a) hybridizing a first primer of at least sixteen pairs of primers to a first portion of at least sixteen target sequences, wherein each primer pair is specific for a different sequence, wherein said target sequences are immobilized on a solid phase surface, and wherein said first primer further comprises an adapter sequence;

b) hybridizing a second primer of said at least sixteen pairs of primers ~~pairs~~ to a second portion of said at least sixteen target sequences;

c) extending either said first primer or said second primer of said at least sixteen pairs of primers towards the other;

d) ligating said first and second primers of said at least sixteen pairs of primers together to form ~~a~~at least sixteen modified primers;

e) contacting said adapter sequence of said at least sixteen modified primers or ~~its~~their complement with an array comprising:

i) a substrate with a surface comprising discrete sites; and

ii) a population of microspheres comprising at least a first subpopulation comprising a first capture probe, such that said first capture probe and an amplification product of said modified primer form a hybridization complex; wherein said microspheres are distributed on said surface; and

f) detecting the presence of said at least sixteen modified primers, wherein the presence of a modified primer indicates the presence of at least sixteen target nucleic acid sequences.

23. (previously presented) The method according to claim 22, wherein said modified primers are amplified.

24. (previously presented) The method according to claim 22, wherein said detecting is done by hybridizing a labeled probe to said ligated first and second primers.

25. (previously presented) The method according to claim 22, wherein said substrate is a fiber optic bundle.

26. (previously presented) The method according to claim 22, wherein said discrete sites comprise wells.

27. (previously presented) The method according to claim 22, wherein said detecting is done by labeling amplification products from said ligated first and second primers.

28. (previously presented) The method according to claim 22, wherein one of said first primer or said second primer of each primer pair is an allele specific primer.

29. (currently amended) A method of detecting a target nucleic acid sequence comprising:

a) hybridizing a first primer to a first portion of a target sequence, wherein said target sequences[[~~s are~~]] is immobilized on a solid phase surface, and wherein said first primer further comprises an adapter sequence;

b) hybridizing a second primer to a second portion of said target sequence, wherein said first portion of said target sequence and said second portion of said target sequence are not adjacent;

c) extending either said first primer or said second primer towards the other;

d) ligating said first and second primers together to form a modified primer;

e) contacting said adapter sequence of said modified primer or its complement with an array comprising:

i) a substrate with a surface comprising discrete sites; and

ii) a population of microspheres comprising at least a first subpopulation comprising a first nucleic acid capture probe, such that said first capture probe and an amplification product of said modified primer form a hybridization complex; wherein said microspheres are distributed on said surface; and

f) detecting the presence of said modified primer to thereby detect said target nucleic acid sequence.